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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/385,584 | 08/27/1999 | MICHAEL B. BALL | 3817US-(97-1) | 9380 |
| 7590 | 09/21/2006 | | EXAMINER | |
| BRICK G POWER TRASK BRITT & ROSSA P O BOX 2550 SALT LAKE CITY, UT 84110 | | | MANDALA, VICTOR A | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2826 | |

DATE MAILED: 09/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/385,584 | BALL ET AL. | |
| | Examiner | Art Unit | |
| | Victor A. Mandala Jr. | 2826 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 29 June 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 33-37 and 41-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 33-37 and 41-56 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 33-37 and 41-56 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,674,595 Busacco et al.

1. Referring to claim 33, a pre-formed solder mask, comprising: a film of mask material comprising a polymer, (Figure 2 &3 #22 and Col. 3 Line 35), and having a substantially uniform thickness; and at least one open aperture, (Figure 2 &3 #28), formed through said the film, (Figure 2 &3 #22), located correspondingly within said the film, (Figure 2 &3 #22), to a contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32), location of a substrate, (Figure 2 &3 #14), upon which the pre-formed solder mask, (Figure 2 &3 #22), is to be disposed, and including a surface configured, (Figure 2 &3 #24), to maintain contact with and form a peripheral shape of a conductive structure, (Figure 2 &3 #18), to be formed on said the contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).
2. Referring to claim 34, a pre-formed solder mask of claim 33, wherein said the at least one open aperture, (Figure 2 &3 #28), is configured to be positioned over and to expose a non-peripheral region, (the inner region of #28), of the contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).

3. Referring to claim 35, a pre-formed solder mask of claim 33, wherein said the substantially uniform thickness of said the film, (Figure 2 &3 #22), substantially corresponds to a desired height of said the conductive structure, (Figure 2 &3 #18).
4. Referring to claim 36, a pre-formed solder mask of claim 33, wherein said the solder mask material is a polymer, (Figure 2 &3 #22 and Col. 3 Line 35).
5. Referring to claim 37, a pre-formed solder mask of claim 33, wherein said the solder mask material is formulated to shrink or degrade upon exposure to at least one of radiation, a plasma, and a shrinking agent, (Figure 2 &3 #22 and Col. 3 Line 49-57).
6. Referring to claim 41, a pre-formed solder mask of claim 33, wherein said the film is configured to be adhered to a substrate, (Figure 2 &3 #24 and Col. 3 Line 27-28).
7. Referring to claim 42, a pre-formed solder mask of claim 33, further comprising an adhesive on a surface of said the film, (Figure 2 &3 #24 and Col. 3 Line 27-28).
8. Referring to claim 43, a pre-formed solder mask, comprising: a film of solder mask material comprising a polymer, (Figure 2 &3 #22 and Col. 3 Line 35), and having a substantially uniform thickness, said the film, (Figure 2 &3 #22), including a surface configured, (Figure 2 &3 #24), to be adhered to a substrate, (Figure 2 &3 #14); and at least one open aperture, (Figure 2 &3 #28), formed through said the film, (Figure 2 &3 #22), located correspondingly within said the film, (Figure 2 &3 #22), to a contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32), location of a substrate, (Figure 2 &3 #14), upon which the pre-formed solder mask, (Figure 2 &3 #22), is to be disposed, and including a surface configured, (Figure 2 &3 #24), to maintain contact with and define a peripheral shape of a conductive structure, (Figure 2

&3 #18), to be formed on said the contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).

9. Referring to claim 44, a pre-formed solder mask of claim 43, wherein said the at least one open aperture, (Figure 2 &3 #28), is configured to be positioned over and to expose a non-peripheral region, (the inner region of #28), of the contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).

10. Referring to claim 45, a pre-formed solder mask of claim 43, wherein said the substantially uniform thickness of said the film, (Figure 2 &3 #22), substantially corresponds to a desired height of said the conductive structure, (Figure 2 &3 #18).

11. Referring to claim 46, a pre-formed solder mask of claim 43, wherein said the solder mask material is a polymer, (Figure 2 &3 #22 and Col. 3 Line 35).

12. Referring to claim 47, a pre-formed solder mask of claim 43, wherein said the solder mask material is formulated to shrink or degrade upon exposure to radiation, a plasma, or a shrinking agent, (Figure 2 &3 #24 and Col. 3 Line 49-57).

13. Referring to claim 48, a pre-formed solder mask of claim 43, wherein said the surface of said the film includes an adhesive material, (Figure 2 &3 #24 and Col. 3 Line 27-28).

14. Referring to claim 49, a semiconductor device assembly, comprising: a substrate including at least one contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32); a pre-formed film of solder mask material comprising a polymer, (Figure 2 &3 #22 and Col. 3 Line 35), and disposed on said the substrate, (Figure 2 &3 #14), said the pre-formed film having a substantially uniform thickness; and at least one open aperture, (Figure 2 &3 #282), formed through said pre-formed film, (Figure 2 &3 #22), located correspondingly within the

film, (Figure 2 &3 #22), to said the at least one contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32), and configured to form a peripheral shape of a conductive structure, (Figure 2 &3 #18).

15. Referring to claim 50, a semiconductor device assembly of claim 49, further comprising a conductive structure, (Figure 2 &3 #18), substantially filling said the at least one open aperture, (Figure 2 &3 #28), and in communication with said the at least one contact, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).

16. Referring to claim 51, a semiconductor device assembly of claim 50, wherein said the conductive structure, (Figure 2 &3 #18), protrudes beyond an exposed surface, (in the horizontal direction), of said the pre-formed film, (Figure 2 &3 #22

17. Referring to claim 52, a semiconductor device assembly of claim 49, wherein said the at least one open aperture, (Figure 2 &3 #28), is positioned over and exposes a non-peripheral region, (the inner region of #28), of said the at least one contact pad, (Figure 2 &3 located below #18 but not labeled Col. 2 Line 30-32).

18. Referring to claim 53, a semiconductor device assembly of claim 49, wherein said the substantially uniform thickness of said the film, (Figure 2 &3 #22), substantially corresponds to a desired height of said the conductive structure, (Figure 2 &3 #18).

19. Referring to claim 54, a semiconductor device assembly of claim 49, wherein said the solder mask material is a polymer, (Figure 2 &3 #22 and Col. 3 Line 35).

20. Referring to claim 55, a semiconductor device assembly of claim 49, wherein said the solder mask material is formulated to shrink or degrade upon exposure to at least one of radiation, a plasma, and a shrinking agent, (Figure 2 &3 #22 and Col. 3 Line 49-57).

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21. Referring to claim 56, a semiconductor device assembly of claim 49, wherein said the surface of said the pre-formed film includes an adhesive material, (Figure 2 &3 #24 and Col. 3 Line 27-28).
22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 5,521,438 Okamoto et al. Okamoto et al. teaches solder containing copper.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor A. Mandala Jr. whose telephone number is (571) 272-1918. The examiner can normally be reached on Monday through Thursday from 8am till 6pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

VAMJ
9/17/06



**EVAN PERT
PRIMARY EXAMINER**